

WHAT IS CLAIMED IS:

1 1. A method for increasing quality of an enhanced output signal to
2 approximate an undistorted sound signal, the method comprising steps of:
3 receiving a distorted input signal that includes an embedded corrupting
4 signal, wherein the embedded corrupting signal is statistically related to the undistorted
5 sound signal;
6 determining an enhancement signal by finding a difference between the
7 distorted input signal and the enhanced output signal, whereby the enhancement signal
8 attempts to offset the embedded corrupting signal;
9 analyzing the enhancement signal; and
10 producing the enhanced output signal, based at least in part upon the
11 analyzing step.

1 2. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 1, wherein:
3 the analyzing step comprises a step of determining a set of parameters
4 from the enhancement signal, and
5 the set includes a power of the enhancement signal, determined over a
6 finite-support window.

1 3. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 2, wherein possible values
3 for the power are constrained by characteristics of the distorted input signal.

1 4. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 2, further comprising a step
3 of increasing the periodicity of the distorted input signal.

1 5. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 1, wherein:
3 the analyzing step comprises determining a set of parameters from the
4 enhancement signal, and
5 possible values for at least some of the set are constrained by
6 characteristics of the distorted input signal.

1 6. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 1, further comprising a step
3 of increasing periodicity of the distorted input signal.

1 7. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 1, wherein the analyzing step
3 includes a step of feeding-back the enhanced output signal to affect determination of the
4 enhanced output signal.

1 8. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 1, further comprising
3 additional determining, analyzing and producing steps to iteratively refine the enhanced
4 output signal.

1 9. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 1, further comprising a step
3 of determining an amount of forward-in-time sample-sequences to use in determining the
4 enhanced output signal.

1 10. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 1, further comprising a step
3 of determining an amount of backward-in-time sample-sequences to use in determining
4 the enhanced output signal.

1 11. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 1, wherein the embedded
3 corrupting signal is introduced as an artifact of encoding and decoding of the undistorted
4 sound signal.

1 12. A computer-readable medium having computer-executable
2 instructions for performing the computer-implementable method for increasing quality of
3 the enhanced output signal to approximate the undistorted sound signal of claim 1.

1 13. A method for increasing quality of an enhanced output signal to
2 approximate an undistorted sound signal, the method comprising steps of:

3 receiving a distorted input signal that includes an embedded corrupting
4 signal, wherein the embedded corrupting signal is statistically related to the undistorted
5 sound signal;
6 estimating a first iteration enhanced output signal;
7 determining a first iteration enhancement signal by finding a difference
8 between the distorted input signal and the first iteration enhanced output signal;
9 analyzing the first iteration enhancement signal; and
10 producing a second iteration enhanced output signal, based at least in part
11 upon the analyzing step.

1 14. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 13, wherein:
3 the analyzing step comprises a step of determining a set of parameters
4 from the enhancement signal, and
5 the set includes a power of the enhancement signal, determined over a
6 finite-support window.

1 15. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 14, wherein possible values
3 for the power are constrained by characteristics of the distorted input signal.

1 16. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 14, further comprising a step
3 of increasing periodicity of the distorted input signal.

1 17. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 13, wherein:
3 the analyzing step comprises determining a set of parameters from the
4 enhancement signal, and
5 possible values for at least some of the set are constrained by
6 characteristics of the distorted input signal.

1 18. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 13, further comprising a step
3 of increasing periodicity of the distorted input signal.

1 19. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 13, determining an amount
3 of forward-in-time sample-sequences to use in determining the enhanced output signal.

1 20. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 13, determining an amount
3 of backward-in-time sample-sequences to use in determining the enhanced output signal.

1 21. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 13, wherein the embedded
3 corrupting signal is introduced as an artifact of encoding and decoding of the undistorted
4 sound signal.

1 22. The method for increasing quality of the enhanced output signal to
2 approximate the undistorted sound signal as recited in claim 13, wherein the first iteration
3 enhancement signal and the second iteration enhancement signal correspond to a same
4 portion of the undistorted sound signal.

1 23. A computer-readable medium having computer-executable
2 instructions for performing the computer-implementable method for increasing quality of
3 the enhanced output signal to approximate the undistorted sound signal of claim 13.

1 24. A sound enhancement system that improves a distorted input signal
2 to produce an enhanced output signal where the distorted input signal includes an
3 embedded corrupting signal, wherein the embedded corrupting signal is statistically
4 related to an undistorted sound signal, the sound enhancement system comprising:

5 an enhancement circuit that receives the distorted input signal and
6 produces a first iteration enhanced output signal;

7 a feedback circuit that uses the first iteration enhanced output signal to
8 effect production of a second iteration enhanced output signal by the enhancement circuit;
9 and

10 an output circuit that produces the enhanced output signal upon completion
11 of at least one iteration cycle.

1 25. The sound enhancement system that improves the distorted input
2 signal to produce the enhanced output signal where the distorted input signal includes the
3 embedded corrupting signal introduced as the artifact of encoding and decoding of the
4 undistorted sound signal wherein the embedded corrupting signal is statistically related to
5 the undistorted sound signal as recited in claim 24, wherein:

6 a set of parameters is determined from the enhancement signal, and
7 the set includes a power of the enhancement signal, determined over a
8 finite-support window.

1 26. The sound enhancement system that improves the distorted input
2 signal to produce the enhanced output signal where the distorted input signal includes the
3 embedded corrupting signal introduced as the artifact of encoding and decoding of the
4 undistorted sound signal wherein the embedded corrupting signal is statistically related to
5 the undistorted sound signal as recited in claim 25, wherein possible values for the power
6 is constrained by characteristics of the distorted input signal.

1 27. The sound enhancement system that improves the distorted input
2 signal to produce the enhanced output signal where the distorted input signal includes the
3 embedded corrupting signal introduced as the artifact of encoding and decoding of the
4 undistorted sound signal wherein the embedded corrupting signal is statistically related to
5 the undistorted sound signal as recited in claim 24, wherein the periodicity of the
6 distorted input signal is increased by the enhancement circuit.

1 28. The sound enhancement system that improves the distorted input
2 signal to produce the enhanced output signal where the distorted input signal includes the
3 embedded corrupting signal introduced as the artifact of encoding and decoding of the
4 undistorted sound signal wherein the embedded corrupting signal is statistically related to
5 the undistorted sound signal as recited in claim 24, wherein the embedded corrupting
6 signal is introduced as an artifact of encoding and decoding of the undistorted sound
7 signal.

1 29. The sound enhancement system that improves the distorted input
2 signal to produce the enhanced output signal where the distorted input signal includes the
3 embedded corrupting signal introduced as the artifact of encoding and decoding of the
4 undistorted sound signal wherein the embedded corrupting signal is statistically related to

- 5 the undistorted sound signal as recited in claim 24, wherein the first iteration
6 enhancement signal and the second iteration enhancement signal correspond to a same
7 portion of the undistorted sound signal.